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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/657,610	09/08/2003	Weibin Jiang	M03A224	1772

7590 11/09/2005

Philip H. Von Neida
The BOC Group, Inc.
Legal Services - Intellectual Property
100 Mountain Ave.
Murray Hill, NJ 07974

EXAMINER

VANOY, TIMOTHY C

ART UNIT	PAPER NUMBER
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1754

DATE MAILED: 11/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/657,610	Applicant(s) JIANG ET AL.	
	Examiner Timothy C. Vanoy	Art Unit 1754	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-41 is/are pending in the application.
- 4a) Of the above claim(s) 28-36 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-27 and 37-41 is/are rejected.
- 7) ☒ Claim(s) 12 is/are objected to.
- 8) ☒ Claim(s) 1-41 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>9/8/2003</u> | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-27 and 37-41 (group I), drawn to a method for the partial oxidation of hydrocarbons to produce hydrogen and carbon monoxide, classified in class 423, subclass 650+.
- II. Claims 28-36 (group II), drawn to a reactor, classified in class 422, subclass 129+.

The inventions are distinct, each from the other, because the inventions set forth in claims 1-27 and 37-41 (group I) and claims 28-36 (group II) are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case, the apparatus as claimed can be used for another and materially different process such as a process for the purification of the exhaust gas emitted from an internal combustion engine.

Because these inventions are distinct for the reasons given above and the claims set forth in groups I and II have acquired a separate status in the art as shown by their different classification, the search required for the claims of group I is not required for the claims of group II, and the claims set forth in groups I and II have acquired a

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separate status in the art because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

During a telephone conversation with Mr. Philip Von Neida, applicants' attorney, on Nov. 1, 2005 a provisional election was made with traverse to prosecute the invention of the method, claims 1-27 and 37-41 (group I). Affirmation of this election must be made by the applicants in their reply to this Office action. Claims 28-36 (group II) are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

The applicants are reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Objections

- a) Claim 12 is objected to because it is a functional duplicate of claim 1.

Claim Rejections - 35 USC § 103

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The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

The person having ordinary skill in the art has the capability of understanding the scientific and engineering principles applicable to the claimed invention. The references in this application reasonably reflect this level of skill.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-27 and 37-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 0 548 679 A in view of the article titled "Partial Oxidation of

Methane Using the Redox of Cerium Oxide” by Otsuka et al. published in Chemistry Letters, pgs. 1517-1520, (1993).

EP 0 548 679 A describes a similar process for catalytically converting methane and oxygen into synthesis gas (carbon monoxide and hydrogen) via passage of the methane and oxygen over a catalyst that may be rhodium supported on stabilized zirconia (please see the English abstract), wherein the zirconia may be stabilized with ceria (please also see pg. 4 Ins. 25-28).

The difference between the applicants' claims and EP 0 548 679 A is that the applicants' claims specifically call for the use of a ceria-coated zirconia, whereas pg. 4 Ins. 25-28 in EP 0 548 679 A describes that the zirconia may be stabilized with a plurality of compounds to include the ceria of the applicants' claims, however it is submitted to have been obvious to one of ordinary skill in the art at the time the invention was made to preferentially select the ceria out of the stabilizing compounds listed on pg. 4 Ins. 25-28 in EP 0 548 679 A, as called for in the applicants' claims, because such selection of a known material based on its suitability for its intended purpose has been found by the courts to support a *prima facie* obviousness determination: please see the discussion of the *Sinclair and Carroll Co. vs. Interchemical Corp.* 325 U. S. 327, 65 USPQ 297 (1945) court decision set forth in section 2144.07 in the MPEP (Rev. 2, May 2004).

The difference between the applicants' claims and EP 0 548 679 A is that the applicants' claims call for feeding hydrogen into the feed gas mixture entering the catalyst.

The Otsuka et al. article titled "Partial Oxidation of Methane Using the Redox of Cerium Oxide" discloses that in processes for converting methane into synthesis gas using ceria, the reduced ceria after the oxidation of the methane can be used to convert carbon dioxide into carbon monoxide (please see the English abstract and also reactions 1 and 2 on pg. 2 in this Otsuka et al. article), thereby fairly suggesting that a reducing agent (such as hydrogen) be fed into the feed gas entering the catalyst to reduce the ceria.

The examples on pgs. 10 and 11 in EP 0 548 679 A describe rates of selectivity of conversion of the hydrocarbon into carbon monoxide that are less than 100% (Example No. 7 has a rate of selectivity that is only 82.3%), thereby fairly suggesting that some of the hydrocarbons are being oxidized into unwanted carbon dioxide.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process described in EP 0 548 679 A by including hydrogen in the feed gas, as fairly suggested by the English abstract of the Otsuka et al. article and required by the applicants' claims, because of the advantage of the hydrogen-reduced ceria to promote the reduction of the unwanted carbon dioxide that is generated in the process of EP 0 548 679 A, as evidenced by the rates of CO selectivity set forth in the examples on pgs. 10 and 11 in EP 0 548 679 A.

The difference between the applicants' claims and EP 0 548 679 A is that applicants' claim 22 calls for feeding carbon dioxide into the feed gas entering the catalyst.

The Otsuka et al. article titled "Partial Oxidation of Methane Using the Redox of Cerium Oxide" discloses that in processes for converting methane into synthesis gas using ceria, the reduced ceria after the oxidation of the methane can be used to convert carbon dioxide into carbon monoxide (please see the English abstract and also reactions 1 and 2 on pg. 2 in this Otsuka et al. article).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process described in EP 0 548 679 A by injecting carbon dioxide into the feed gas, in the manner required by applicants' claim 22, because the English abstract of the Otsuka et al. article reports that reduced ceria promotes the conversion of carbon dioxide into carbon monoxide. Thus, adding carbon dioxide to the feed gas is expected to increase the yield of carbon monoxide – a wanted and necessary component of synthesis gas.

The difference between the applicants' claims and EP 0 548 679 A and the Otsuka et al. reference is that the applicants' dependent claims recite the latent properties of temperatures, pressures, flow rates, etc. for the applicants' process (which is obvious from EP 0 548 679 A in view of Otsuka et al.), however it is submitted that it would have been obvious to one of ordinary skill in the art at the time the invention was made to have measured and reported the temperatures, pressures, flow rates, etc. in the process resulting from the modification of EP 0 548 679 A in the manner suggested by the Otsuka et al. reference, in the manner required by the applicants' dependent claims, because the courts have already determined that such recognition of latent properties in the prior art does not render nonobvious an otherwise known invention:

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please see the discussion of the *In re Wiseman* 596 F.2d 1019, 201 USPQ 658 (CCPA 1979) court decision set forth in section 2145(II) in the MPEP (Rev. 2, May 2004).

The following references, which are indicative of the state of the art, are made of record:

U. S. Patent 6,527,980 B1 disclosing a method for making hydrogen and carbon monoxide from methane;

U. S. Patent 6,733,692 B2 disclosing the use of a Rh catalyst in a process for the partial oxidation of hydrocarbons;

U. S. Patent 6,887,455 B2 disclosing a process for the catalytic generation of hydrogen by using ceria and zirconia;

U. S. Patent 6,946,114 B2 disclosing the use of a lanthanide-promoted rhodium catalyst for producing synthesis gas;

U. S. Patent Application Pub. US 2004/0052725 A1 disclosing a process for producing synthesis gas;

U. S. Patent Application Pub. US 2004/0191165 A1 disclosing the use of a ceria-rhodium catalyst for converting hydrocarbons into a reformed gas, and

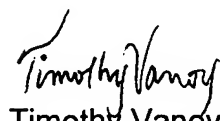
U. S. Patent Application Pub. US 2005/0112047 A1 disclosing a lanthanide-promoted rhodium catalyst useful for producing synthesis gas.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy C. Vanoy whose telephone number is 571-272-8158. The examiner can normally be reached on Mon-Fri 8-4:30.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 571-272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Timothy Vandy
Patent Examiner
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